

CLAIMS

What is claimed is:

1. An expression vector useful for immunizing a host comprising nucleic acid sequences encoding modified KSA.
- 5 2. The expression vector of claim 1 wherein the vector is a plasmid or a viral vector.
3. The expression vector of claim 2 wherein the viral vector is selected from the group consisting of poxvirus, adenovirus, retrovirus, herpesvirus, and adeno-associated virus.
4. The expression vector of claim 3 wherein the viral vector is a poxvirus selected from the group consisting of vaccinia, NYVAC, avipox, canarypox, ALVAC, ALVAC(2),
10 fowlpox, and TROVAC.
5. The expression vector of claim 4 wherein the viral vector is a poxvirus selected from the group consisting of NYVAC, ALVAC, and ALVAC(2).
6. The expression vector of claim 1 further comprising at least one additional tumor-associated antigen.
- 15 7. The expression vector of claim 6 wherein the vector is a plasmid or a viral vector.
8. The expression vector of claim 7 wherein the viral vector is selected from the group consisting of poxvirus, adenovirus, retrovirus, herpesvirus, and adeno-associated virus.
9. The expression vector of claim 8 wherein the viral vector is a poxvirus selected from the group consisting of vaccinia, MVA, NYVAC, avipox, canarypox, ALVAC, ALVAC(2),
20 fowlpox, and TROVAC.
10. The expression vector of claim 9 wherein the viral vector is a poxvirus selected from the group consisting of NYVAC, ALVAC, and ALVAC(2).
11. The expression vector of claim 1 further comprising at least one nucleic sequence encoding an angiogenesis-associated antigen.
- 25 12. The expression vector of claim 11 wherein the vector is a plasmid or a viral vector.
13. The expression vector of claim 12 wherein the viral vector is selected from the group consisting of poxvirus, adenovirus, retrovirus, herpesvirus, and adeno-associated virus.
14. The expression vector of claim 13 wherein the viral vector is a poxvirus selected from the group consisting of vaccinia, MVA, NYVAC, avipox, canarypox, ALVAC, ALVAC(2),
30 fowlpox, and TROVAC.
15. The expression vector of claim 14 wherein the viral vector is a poxvirus selected from the group consisting of NYVAC, ALVAC, and ALVAC(2).

16. The expression vector of claim 6 further comprising at least one nucleic sequence encoding an angiogenesis-associated antigen.
17. The expression vector of claim 16 wherein the vector is a plasmid or a viral vector.
18. The expression vector of claim 17 wherein the viral vector is selected from the group
5 consisting of poxvirus, adenovirus, retrovirus, herpesvirus, and adeno-associated virus.
19. The expression vector of claim 17 wherein the viral vector is a poxvirus selected from the group consisting of vaccinia, MVA, NYVAC, avipox, canarypox, ALVAC, ALVAC(2), fowlpox, and TROVAC.
20. The poxvirus of claim 18 wherein the viral vector is a poxvirus selected from the group
10 consisting of NYVAC, ALVAC, and ALVAC(2).
21. The expression vector of claim 1, 6, 11 or 16 further comprising at least one nucleic acid sequence encoding a co-stimulatory component.
22. The expression vector of claim 21 wherein the co-stimulatory component is selected from the group consisting of B7.1, LFA-3 and ICAM-1.
- 15 23. The expression vector of claim 22 or 23 wherein the vector is a plasmid or a viral vector.
24. The expression vector of claim 23 wherein the viral vector is selected from the group consisting of poxvirus, adenovirus, retrovirus, herpesvirus, and adeno-associated virus.
25. The expression vector of claim 24 wherein the viral vector is a poxvirus selected from the group consisting of vaccinia, MVA, NYVAC, avipox, canarypox, ALVAC, ALVAC(2),
20 fowlpox, and TROVAC.
26. The poxvirus of claim 25 wherein the viral vector is a poxvirus selected from the group consisting of NYVAC, ALVAC, and ALVAC(2).
27. A composition comprising an expression vector in a pharmaceutically acceptable carrier, said vector comprising nucleic acid sequences encoding modified KSA.
- 25 28. The expression vector of claim 27 wherein the vector is a plasmid or a viral vector.
29. The expression vector of claim 28 wherein the viral vector is selected from the group consisting of poxvirus, adenovirus, retrovirus, herpesvirus, and adeno-associated virus.
30. The expression vector of claim 29 wherein the viral vector is a poxvirus selected from the group consisting of vaccinia, MVA, NYVAC, avipox, canarypox, ALVAC, ALVAC(2),
30 fowlpox, and TROVAC.
31. The poxvirus of claim 30 wherein the viral vector is a poxvirus selected from the group consisting of NYVAC, ALVAC, and ALVAC(2).

32. A method for preventing or treating cancer comprising administering to a host an expression vector comprising nucleic acid sequences encoding modified KSA.
33. The expression vector of claim 32 wherein the vector is a plasmid or a viral vector.
34. The expression vector of claim 33 wherein the viral vector is selected from the group
5 consisting of poxvirus, adenovirus, retrovirus, herpesvirus, and adeno-associated virus.
35. The expression vector of claim 34 wherein the viral vector is a poxvirus selected from the group consisting of vaccinia, MVA, NYVAC, avipox, canarypox, ALVAC, ALVAC(2), fowlpox, and TROVAC.
36. The poxvirus of claim 35 wherein the viral vector is a poxvirus selected from the group
10 consisting of NYVAC, ALVAC, and ALVAC(2).
36. An isolated DNA molecule comprising the modified KSA coding sequence illustrated in Figure 3.
36. An isolated DNA molecule comprising a nucleotide sequence encoding modified KSA having the amino acid sequence shown in Figure 3.
- 15 37. An isolated DNA molecule comprising CEA, p53, and modified KSA coding sequences, the CEA sequence being CEA-CAP1-6D-1,2 as illustrated in Figure 2, the p53 sequence being the p53 sequence illustrated in Figure 1, and the modified KSA sequence being that shown in Figure 3.